

5 Can You Feel the Difference?




Good scientific experiments are often designed to test only a single factor, or **variable**. You may remember that Dr. Goldberger had screens put on the windows during his experiment on prisoners. He also had bedsheets and clothes washed regularly. One strength of Dr. Goldberger's experiment was his effort to reduce all the other variables—such as the presence of insects or variations in cleanliness—that could affect his results. His goal was to make diet the *only* factor that was being changed. In this case, diet was the variable being tested.

Scientists are interested in how people respond to the environment. People use their senses—touch, sight, hearing, smell, and taste—to get information about their surroundings. This information then travels through nerves to the human brain. In the next two activities you will investigate your sense of touch. Can you identify all of the variables that might affect your results? What can you do to try to keep all of these variables the same?

CHALLENGE

Which part of your arm is most sensitive to touch?

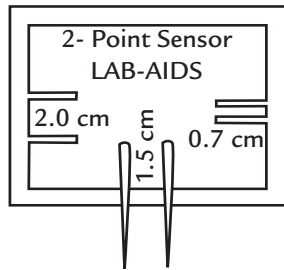
MATERIALS	
	<i>For each pair of students</i> 1 2-point sensor 2 plastic toothpicks



SAFETY

Be careful when doing the touch tests. Press gently when testing, making sure to only slightly depress the skin surface.

PROCEDURE



1. Slide 2 plastic toothpicks into the 2-point sensor on the side marked “1.5 cm.”



2. With your eyes open, investigate your sense of touch by touching the skin of your fingers, palm of your hand, and forearm with the point of just *one* toothpick.



3. With your eyes open, touch your fingers, palm, and forearm with the points of both toothpicks.



4. Record your observations in your science notebook while your partner investigates his or her own sense of touch.



5. Have your partner close his or her eyes while you touch the skin on his or her fingers with either one or two toothpick points. Touch just hard enough to see that the points are barely pushing down on the skin. Randomly alternate between one and two points. Can your partner tell the difference?
6. Create a larger version of the table shown on the next page. In the table, record your observations about your partner's ability to tell the difference between one and two points on his or her fingers.



Table 1: Observations of Touch Sensitivity			
Person Being Tested	Fingers	Palm	Forearm
(Name)			
(Name)			



7. Repeat Steps 5 and 6 on your partner's palm *and* forearm.



8. Switch places and repeat Steps 5–7.



9. In your group of four, use Analysis Questions 1 and 2 to discuss your results.

ANALYSIS



- Which part of your arm—your fingers, palm, or forearm—was the most sensitive to touch? What data do you have to support your conclusion?
- In your group, how many people found fingers to be the most sensitive part of their arm? How many found palms or forearms to be the most sensitive? How similar were different individuals' responses to touch?
- Why was it important for the person being tested to close his or her eyes?
- Before scientists make comparisons, it is important that they perform well-designed experiments. In a well-designed experiment, all of the variables, except the one being tested, are kept the same.
 - In your experiment, what variables did you keep the same?
 - Were there any variables (except for the one being tested) that you could not keep the same?